



Micro Motion, Inc. 7070 Winchester Circle, Boulder CO 80301 USA

ISO/IEC 17025 ACCREDITED CALIBRATION CERTIFICATE: **1.31210243**

Object:	Coriolis flow meter	These measurements have been made using the calibration standard listed, which is traceable to the International System of Units (SI), through one or more of the following National Metrology Institutes: CENAM-Mexico, INM-Romania, NIM-China, NIST-USA, and VSL-The Netherlands.
Object description-100% rate:	12000 kg/min	
Manufacturer:	Micro Motion Inc.	
Type:	CMFHC3M819N2BAEZZZMCREHTWPIC	
Serial number:	12102714	
Customer:	ENCANA OIL AND GAS USA INC ENCANA STORAGE YARD 15002 94 ST GRANDE PRAIRIE, T8V 8L7, CA	This calibration was performed by comparison to a reference meter (dynamic start/stop reference meter method) as described in ISO 10790:2015(E) "Measurement of fluid flow in closed conduits - Guidance to the selection, installation and use of Coriolis meters (mass flow, density and volume flow measurements)", Annex A "Calibration techniques", and the internal procedure(s) listed below.
Order number:	10171558	
Date of calibration:	2014.07.23 07:23:37	
Calibration fluid:	H2O	
Calibration standard:	TSM3A@SSCB:1	
Calibration conditions:	43 ... 121 kPa(g) 22.3 ... 22.5 degC	Internal procedures: Doc-011034
Environmental conditions:	85 kPa(a) 21.3 ... 21.3 degC 48.8 ... 48.8 %RH	
Measurement uncertainty:	The reported expanded uncertainties (U_{95}) are based on the combined uncertainties multiplied by a coverage factor $k=2$, which provides a level of confidence of approximately 95%. All uncertainties have been determined in accordance with the GUM and EA-04/2.	

The processes used to obtain these calibration results comply with the requirements of ISO/IEC 17025:2017, and ANSI/NCSL Z540-1-1994; Part 1.

This calibration certificate only applies to the item(s) identified and shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the United States Federal Government.

No statement of compliance with specifications is listed on this certificate. Measurement results are reviewed, to determine if any exceeded the manufacturer's specifications. Acceptance Criteria per Simple Acceptance Rule, Measurement Uncertainty is not applied when decision is made.

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Instrument adjustment:

☐ AS FOUND ☒ AS LEFT

Comments:

CORIOLIS ISO/IEC 17025 VERIFY

Model Code	Serial ID	Order ID	Line	Item	Customer Tag
CMFHC3M819N2BAEZZZMCREHTWPIC	12102714	10171558	1.1	1	FE-1031C
PUCK800	33092808				

Meter Calibration Results for Meter Under Test									
D1: 0	Mass Rate (kg/min)	Mass Total (kg)	Mass Error (%)	Mass U ₉₅ (%)	Mass Density (kg/m ³)	Mass Spec ± (%)	Mass PCP/PCF: 0.0/0.0000	DFQ1: 0	
D2: 1	Grp	DensCa: 0.9266	1131	64.33 ^A	U ₉₅ Flow: 1131	PCP/PCF: 0.0/0.0	DFQ2: 0		
K1: 9266.405		DensMF: 1				FlowCal: 6996.54.26	FFQ: 0		
K2: 11315.61		VOIMF: 1	102.9048	0.101	229.6	Zero(uSec): -0.0062	FTG: 0		
DT: 4.33 0.9		MassMF: 31.26699	0.196	128.8	Mass flow cut-off (kg/min): 21.4	DTG: 0			
Average Calibration Results for Meter Under Test									

*These measurement results are not part of the laboratories scope of accreditation.

Grp	Mass Rate (kg/min)	Mass Total (kg)	Mass Error (%)	Volume Rate (l/min)	Volume Total (l)	Volume Error (%)	Density (kg/m ³)	Density Error (kg/m ³)	Fluid Pressure (kPa)*	Fluid Temp (°C)*
1	11960	11980.53	-0.002	11990	12006.76	-0.002	997.816	-0.006	121.0	22.4
2	1193	1196.073	-0.077	1196	1198.713	-0.077	997.798	0.008	79.1	22.4
3	6021	6028.400	-0.016	6034	6041.988	-0.014	997.751	-0.018	43.1	22.4

*These measurement results are not part of the laboratories scope of accreditation.

Calibration Uncertainties									Manufacturer Specifications		
Grp	Rpts (n)	Mass Rate (kg/min)	Mass u _A (%)	Mass U ₉₅ (%)	Volume u _A (%)	Volume U ₉₅ (%)	Density u _A (kg/m ³)	Density U ₉₅ (kg/m ³)	Mass Spec ± (%)	Volume Spec ± (%)	Density Spec ± (kg/m ³)
1	3	11960	0.002	0.030	0.002	0.031	0.008	0.082	0.100	0.112	0.500
2	3	1193	0.005	0.032	0.005	0.033	0.007	0.081	0.189	0.196	0.500
3	3	6021	0.003	0.031	0.003	0.032	0.012	0.084	0.100	0.112	0.500

Calibration Operator

ALMAZOORY, HUSSEIN

Print

Signature

Date

Print

Signature

Date

Note: Calibration certificate without signatures and seal is not valid.

End of calibration certificate